

(19) World Intellectual Property Organization International Bureau



25 MAR 2005



(43) International Publication Date
8 April 2004 (08.04.2004)

PCT

(10) International Publication Number
WO 2004/028682 A3

(51) International Patent Classification⁷: B01J 19/00.
G01N 15/14, 21/05

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(21) International Application Number:
PCT/DK2003/000635

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(22) International Filing Date:
26 September 2003 (26.09.2003)

(81) Designated States (national): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(25) Filing Language: English

(84) Designated States (regional): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

(26) Publication Language: English

[Continued on next page]

(30) Priority Data:

PA 2002 01444	27 September 2002 (27.09.2002)	DK
60/413,771	27 September 2002 (27.09.2002)	US
PA 2003 00969	26 June 2003 (26.06.2003)	DK
60/482,453	26 June 2003 (26.06.2003)	US

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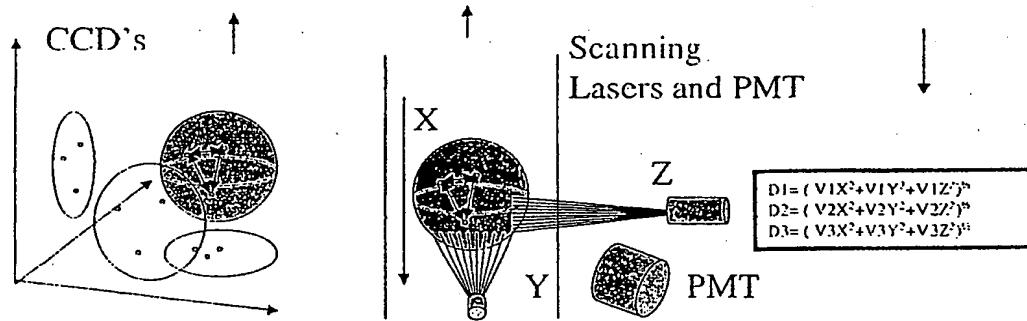
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(54) Title: SPATIALLY ENCODED POLYMER MATRIX

Spatial encoding of beads

$$\begin{array}{l}
 \text{Y1,Z1; Y2,Z2; Y3,Z3} \\
 \text{X1,Z1; X2,Z2; X3,Z3} \\
 \text{X1,Y1; X2,Y2; X3,Y3}
 \end{array}
 \longrightarrow
 \begin{array}{l}
 \text{X1, Y1, Z1} \\
 \text{X2, Y2, Z2} \\
 \text{X3, Y3, Z3}
 \end{array}
 \longrightarrow
 \begin{array}{l}
 \text{V1= (V1X, V1Y, V1Z) = X1-X2, Y1-Y2, Z1-Z2} \\
 \text{V2= (V2X, V2Y, V2Z) = X1-X3, Y1-Y3, Z1-Z3} \\
 \text{V3= (V3X, V3Y, V3Z) = X2-X3, Y2-Y3, Z2-Z3}
 \end{array}$$



(57) Abstract: The invention relates to a spatially encoded polymer matrix in the form of a bead or a granule for combinatorial solid phase synthesis, assaying, functional proteomics and diagnostic use. Compositions of such beads or granules are also provided. Each beaded polymer matrix of the composition comprises a plurality of spatially immobilised particles. The spatial immobilisation of the particles confers on each beaded polymer matrix a "fingerprint" which enables identification of unique beads in a population of beads. The unique identification of individual beads makes it possible to perform combinatorial chemistry strategies while logging individual chemical transformation. Also provided are methods for detection of relative positions in space of particles, methods for generating matrices, methods for distance matrix determination, methods for identifying individual matrices and devices for recording and storing images of matrices.

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**Declarations under Rule 4.17:**

- *as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii)) for all designations*
- *of inventorship (Rule 4.17(iv)) for US only*

Published:

- *with international search report*
- *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments*

(88) Date of publication of the international search report:

5 August 2004

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

INTERNATIONAL SEARCH REPORT

International Application No

PCT/03/00635

A. CLASSIFICATION OF SUBJECT MATTER
 IPC 7 B01J19/00 G01N15/14 G01N21/05

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
 IPC 7 B01J G01N

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, INSPEC, COMPENDEX, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 98/47838 A (ZENECA LTD ;GARMAN ANDREW JOHN (GB); PEARS DAVID ALAN (GB)) 29 October 1998 (1998-10-29)	1-31, 34-68
Y	page 5, line 19 - page 8, line 4; claims 1-6,10-12	69-98, 100
X	US 2002/071121 A1 (BASIFI DAVID A ET AL) 13 June 2002 (2002-06-13)	111
Y	paragraphs '0071!, '0088!, '0089!; figure 6	69-98, 100
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 Further documents are listed in the continuation of box C. Patent family members are listed in annex.

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- *&* document member of the same patent family

Date of the actual completion of the international search

16 June 2004

Date of mailing of the international search report

23.06.2004

Name and mailing address of the ISA

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INTERNATIONAL SEARCH REPORT

International Application No

PCT/03/00635

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	TRAU M ET AL: "NOVEL COLLOIDAL MATERIALS FOR HIGH-THROUGHPUT SCREENING APPLICATIONS IN DRUG DISCOVERY AND GENOMICS" ADVANCED MATERIALS, VCH VERLAGSGESELLSCHAFT, WEINHEIM, DE, vol. 13, no. 12/13, 4 July 2001 (2001-07-04), pages 975-979, XP001130155 ISSN: 0935-9648 the whole document	1,44
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X	US 6 252 236 B1 (FODOR STEPHEN P A ET AL) 26 June 2001 (2001-06-26)	111
Y	the whole document	69-98, 100
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INTERNATIONAL SEARCH REPORT

In... International Application No

PCT/03/00635

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	GB 2 306 484 A (UNIV HERTFORDSHIRE) 7 May 1997 (1997-05-07) the whole document -----	69-98, 100, 111-119

INTERNATIONAL SEARCH REPORT

International application No.
DK 03/00635

Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. Claims Nos.: because they relate to subject matter not required to be searched by this Authority, namely:

2. Claims Nos.: because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:

3. Claims Nos.: because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.

2. As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.

3. As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
1-98,100 (in part),111-119

4. No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- The additional search fees were accompanied by the applicant's protest.
 No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-68

Claim 1, relating to a polymer matrix,
claim 44, relating to a composition comprising a plurality
of beads,
claim 59, relating to a method for detection of relative
positions in space of centers of immobilized particles of
the composition according to claims 44-58,
claim 65, relating to a method for generating a polymer
matrix,
and their dependent claims.

2. claims: 69-98,100 (in part),111-119

Claim 69, relating to a method for distance matrix
determination,
claim 96, relating to a method for identifying individual
polymer matrices in a composition,
claim 111, relating to a device for recording and storing at
least one image,
and their dependent claims.

3. claims: 99,100 (in part)

Claim 99, relating to a method for identifying at least one
bead in a composition, and dependent claim 100 insofar
relating to claim 99.

4. claims: 101-110

Claim 101, relating to a method for recording individual
reaction steps in synthesis of compound on a polymer matrix
according to claim 1-44, and its dependent claims.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No.

PCT

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